

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

_____)	
FESTO CORPORATION,)	
)	
Plaintiff,)	
)	
v.)	CIVIL ACTION NO.
)	88-1814-PBS
SHOKETSU KINZOKU KOGYO KABUSHIKI)	
CO., LTD. a/k/a SMC CORPORATION,)	
and SMC PNEUMATICS, INC.,)	
)	
Defendants.)	
_____)	

MEMORANDUM AND ORDER

June 13, 2005

Saris, U.S.D.J.

I. INTRODUCTION

Ten years after trial, and following two sojourns to the Supreme Court, this seventeen-year-old suit is back on remand from the Federal Circuit. The sole issue on remand is whether plaintiff Festo Corporation ("Festo") can rebut the presumption of surrender by establishing that two equivalents of defendant SMC's accused device would have been unforeseeable to one of ordinary skill in the art at the time of certain narrowing amendments to the application for the Stoll patent (United States Patent No. 4,354,125) held by Festo. The history of this case has been extensively reviewed in prior decisions and will not be repeated here. See, e.g., Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 726-30 (2002); Festo Corp. v.

Shoketsu Kinzoku Kogyo Kabushiki Co., 344 F.3d 1359, 1364-65 (Fed. Cir. 2003).

Following a two-day bench trial,¹ I find that both the single sealing ring and the non-magnetizable aluminum sleeve in the accused SMC device would have been foreseeable to one of ordinary skill in the art at the time of the narrowing amendments, that is November 1981. Because Festo has not rebutted the presumption of surrender for these asserted equivalents, it has not proven patent infringement under the doctrine of equivalents. The Court enters judgment for defendant.

II. FINDINGS OF FACT

The Court presents here only those facts relevant to the issues on remand.

A. Festo Device

Festo holds United States Patent No. 4,354,125 ("the '125 patent") of inventor Dr. Kurt Stoll entitled "Magnetically Coupled Arrangement for a Driving and Driven Member" ("the Festo

¹ The only witnesses at trial on remand were Festo's experts Dr. Barry Wolf, a Ph.D. in mechanical engineering and a professor of mechanical engineering at New York University; and Dr. John Schroeder, a Ph.D. in physics and a magnetic properties expert. SMC introduced no expert testimony, but instead relied on statements made by Festo's experts at earlier proceedings as well as cross-examination to undermine Festo's position.

device").² The Festo device includes a linear motor having a piston (also called a driving member), a cylinder (also called a tube or tubular part), and a driven member (also called a driven assembly or follower). '125 patent, col. 1, ll. 48-56. (See Wolf Direct at 3.)³ The piston is encircled by magnets and is driven along the inside of the cylinder by pressure applied at one end. '125 patent, col. 3, ll. 20-24; id. at col. 2, ll. 13-22. The driven member is external to the cylinder and contains magnets that are coupled by magnetic force to the piston magnets. See id. at col. 1, ll. 53-58; id. at col. 3, ll. 16-17. The "sleeve" is the element that surrounds the magnets on the driven member. Id. at col. 2, ll. 23-26; id. at col. 3, ll. 60-63. (Tr. at 11.) Thus, the driven member, which is not mechanically attached to the piston, is driven along the outside of the cylinder by the movement of the piston. Wherever the piston goes, the follower follows. (Tr. at 8.) This magnetically coupled rodless cylinder "has many industrial uses" in conveying systems and "has been employed in machinery as diverse as sewing equipment and the Thunder Mountain ride at Disney World." Festo, 535 U.S. at 728.

The '125 patent explains that the air gap between the

² The other Festo patent at issue in earlier proceedings in this case, United States Patent No. 3,779,401 ("the Carroll patent"), is not at issue on remand. (See Tr. at 2/157-58.)

³ Festo submitted written direct testimony of Dr. Wolf and Dr. Schroeder prior to the trial on remand.

magnets on the piston and the magnets on the driven member is kept "as small as possible" to maintain a strong coupling force. '125 patent, col. 1, l. 26; see id. at col. 4, ll. 16-29. This distance relates to the thickness of the cylinder. As the patent explains, "[T]he tubular part ... should preferably have thin walls in order to ensure a small total air gap between the two magnet arrangements". Id. at col. 1, l. 68-col. 2, l. 1; see also id. at col. 3, ll. 6-7 ("a relatively thin-walled and narrow tube").

The Festo device includes guide rings at each end of the piston. Id. at col. 2, l. 5; id. at col. 3, ll. 24-30; id. at col. 5, l. 38. The purpose of the guide rings is to facilitate the movement of the piston through the cylinder by preventing the magnets on the piston from engaging the wall of the cylinder. (Tr. at 18-19.) The guide rings also serve to wipe impurities from the inside surface of the cylinder. (Id. at 18-19, 2/14, 2/16-19.)

In 1981, Dr. Stoll amended his patent application for the Festo device and added two limitations. See Festo, 535 U.S. at 728 (describing limitations). The first limitation was a pair of sealing rings, one at each end of the piston. '125 patent, col. 5, l. 37.⁴ The purpose of the sealing rings is to prevent

⁴ Courts have previously noted that each of the Festo sealing rings has a lip on one side, creating a seal in one direction. See Festo, 535 U.S. at 728 ("that the inventions contain a pair of sealing rings, each having a lip on one side");

impurities from penetrating the space between the piston and the cylinder. Id. at col. 3, ll. 43-55. (Tr. at 18-19.) Like the guide rings, the sealing rings also serve to wipe impurities from the inside surface of the cylinder. '125 patent, col. 3, ll. 43-55. (Tr. at 18-19.)

The sealing rings on the piston align with the wiping rings on the driven member in the same plane perpendicular to the axis of the tube. '125 patent, col. 6, ll. 24-27; see id. at col. 1, ll. 63-65 ("Preferably the wiping means of the driven assembly and the sealing means of the piston lie in the same plane transversal to the axis of the tubular part."). (See Tr. at 20.) This alignment prevents "torsional deforming moments" that could result from relatively strong magnets causing the piston and driven member to pinch a relatively thin cylinder and deform it as the piston and driven member travel its length. See '125 patent, col. 1, ll. 63-col. 2, ll. 2. (Tr. at 20-25.)

Torsional deforming moments may also be avoided by use of a relatively thicker cylinder. (Tr. at 39, 2/12, 2/31.) The '125 patent does not define the exact thickness of the cylinder in the Festo device.⁵ Moreover, Festo presented no empirical evidence

Festo, 344 F.3d at 1372 ("Festo argues that SMC's two-way sealing ring was an inferior and unforeseeable equivalent of the one-way *sealing rings* located at each end of the piston in the claimed invention." (emphasis added)).

⁵ "THE COURT: Have you done experiments on the Stoll invention to see what would happen if you just used the one sealing ring? THE WITNESS: Well, you see, you really can't, and

on remand regarding the thickness of the cylinder in the Festo device. (See Tr. at 2/22.)

The second limitation to the '125 patent added in the 1981 amendments was that the sleeve on the driven member be made of magnetizable material. '125 patent, col. 6, ll. 2-3; see Festo, 535 U.S. at 728 (describing limitations). The purpose of a magnetizable sleeve is to shield against magnetic leakage fields. '125 patent, col. 2, ll. 24-28. On a device such as the Festo device, significant magnetic leakage fields could cause undesirable braking forces due to the magnetic attraction between the device and proximate metallic machine parts. Id. (Tr. at 42-43, 79, 2/52-53.) The '125 patent explains:

If the driven assembly is provided with a sleeve made of a magnetisable material, which encircles the hollow cylindrical assembly of the magnet arrangement, magnetic leakage fields in the vicinity of the driven assembly can be kept to a minimum. In this way, undesirable braking forces, which would otherwise be generated while piston and driven assembly pass magnetisable machine components, are avoided.

'125 patent, col. 2, ll. 23-30.

Whereas minimal magnetic leakage fields do not cause braking forces (Tr. at 2/126-27), significant magnetic leakage fields in the Festo device would have required its re-design (Id. at 2/111). There was no empirical evidence at trial on remand as to

the reason you can't is because there's no specification in the patent." (Tr. at 39 (Testimony of Dr. Wolf).)

the strength of any magnetic leakage fields from the Festo device. (See id. at 93-94, 2/55-56, 2/130.) However, the Festo device was designed to minimize magnetic leakage fields. (Id. at 2/102-03, 2/110, 2/113.)

The prior art for the Festo device includes German patent 27 37 924 ("the German patent") for an earlier rodless cylinder ("the German device") that Dr. Stoll invented in 1977. (Tr. at 50-58; see Def. Ex. 7 (English translation of the German patent).) Significantly, unlike the Festo device, the German device uses only one sealing ring (an "o-ring") that seals equally well from both sides. (Tr. at 52, 111, 2/22.) Additionally, the driven member in the German device has a non-magnetizable sleeve. (Id. at 55-58; Def. Ex. 7 at SA22089.)⁶

B. SMC Device

The SMC device is also a magnetically coupled rodless cylinder, composed of a piston, a cylinder, and a driven member. (Wolf Direct at 11.) However, unlike the Festo device, the SMC device employs only one two-way sealing ring instead of two sealing rings. See Festo, 535 U.S. at 729. It also has a guide ring on each end. (Tr. at 32-33.)⁷ Moreover, the sleeve on the

⁶ "Q. But there's no question that this is a prior art patent that shows a non-magnetizable material? A. That's correct" (Tr. at 58 (Testimony of Dr. Wolf).)

⁷ Initially, SMC had a four-ring system identical to Festo's, but it changed to the ring system at issue after Festo's assertion of infringement. The jury found that the SMC device infringed the Stoll patent under the doctrine of equivalents.

SMC driven member is made of a non-magnetizable aluminum alloy. (See id.) Aluminum alloy was a known material in 1981 and has some capability for shielding magnetic fields, although that capability was unknown at the time of the amendments to the Festo device patent application. (Id. at 2/86-87.) At trial on remand, Festo presented no empirical evidence as to the type of magnets used in the SMC device, the strength of those magnets, or the thickness of the SMC cylinder. (Id. at 2/22, 2/39, 2/80.)

III. CONCLUSIONS OF LAW

A. Standards of Review

In Festo, 535 U.S. 722, the Supreme Court reexamined two patent concepts, the doctrine of equivalents and the rule of prosecution history estoppel. Adopting a "flexible bar," the Supreme Court described the analytical framework for these concepts as follows:

Just as [Warner-Jenkinson Co. v. Hilton Davis Chemical Co., 520 U.S. 17 (1997),] held that the patentee bears the burden of proving that an amendment was not made for a reason that would give rise to estoppel, we hold here that the patentee should bear the burden of showing that the amendment does not surrender the particular equivalent in question.... The patentee, as the author of the claim language, may be expected to draft claims encompassing readily known equivalents. A patentee's decision to narrow his claims through amendment may be presumed to be a general disclaimer of the territory between the original claim and the amended claim. [Exhibit Supply Co. v. Ace Patents Corp., 315 U.S. 126, 136-37 (1942)] ("By the amendment [the patentee] recognized and emphasized the

difference between the two phrases and proclaimed his abandonment of all that is embraced in that difference"). There are some cases, however, where the amendment cannot reasonably be viewed as surrendering a particular equivalent. The equivalent may have been unforeseeable at the time of the application; the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question. In those cases the patentee can overcome the presumption that prosecution history estoppel bars a finding of equivalence.

This presumption is not, then, just the complete bar by another name. Rather, it reflects the fact that the interpretation of the patent must begin with its literal claims, and the prosecution history is relevant to construing those claims. When the patentee has chosen to narrow a claim, courts may presume the amended text was composed with awareness of this rule and that the territory surrendered is not an equivalent of the territory claimed. In those instances, however, the patentee still might rebut the presumption that estoppel bars a claim of equivalence. The patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.

Id. at 740-41. Because the amendments in this case were made for a reason relating to patentability, the Supreme Court added:

[T]he question is not whether estoppel applies but what territory the amendments surrendered. While estoppel does not effect a complete bar, the question remains whether petitioner can demonstrate that the narrowing amendments did not surrender the particular equivalents at issue. On these questions,

SMC may well prevail, for the sealing rings and the composition of the sleeve both were noted expressly in the prosecution history.

Id. at 741-42. The case was then remanded for further proceedings in the Court of Appeals or the District Court.

On remand, the Federal Circuit held that Festo could not rebut the presumption of surrender for either accused equivalent under the "tangential relation" or "some other reason" criteria. Festo, 344 F.3d at 1371-72 (discussing sleeve); id. at 1373 (discussing sealing ring). The court held, however, that "[f]actual issues ... exist as to whether an ordinarily skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve." Id. at 1371. Similarly, the Federal Circuit concluded, "Factual issues ... exist as to whether a person of ordinary skill in the art would have considered the accused two-way sealing ring to be an unforeseeable equivalent of the recited pair of sealing rings." Id. at 1372. "[R]ebuttal of the presumption of surrender is a question of law," id. at 1367, that "may be subject to underlying facts" properly decided by the court, not a jury, id. at 1368 n.3. Thus, the Federal Circuit remanded the case "to the district court to determine whether Festo can rebut the presumption of surrender by establishing that the equivalents in question would have been unforeseeable to one of ordinary skill in the art at the time of the amendments." Id. at 1364; see also Festo, 535 U.S. at 740 ("[T]he patentee should bear the

burden of showing that the amendment does not surrender the particular equivalent in question."). The Court may "hear expert testimony and consider other extrinsic evidence relating to the relevant factual inquiries." Festo, 344 F.3d at 1369.

The Federal Circuit defined unforeseeability as "an objective inquiry":

Usually, if the alleged equivalent represents later-developed technology (e.g., transistors in relation to vacuum tubes, or Velcro® in relation to fasteners) or technology that was not known in the relevant art, then it would not have been foreseeable. In contrast, old technology, while not always foreseeable, would more likely have been foreseeable. Indeed, if the alleged equivalent were known in the prior art in the field of the invention, it certainly should have been foreseeable at the time of the amendment. By its very nature, objective unforeseeability depends on underlying factual issues relating to, for example, the state of the art and the understanding of a hypothetical person of ordinary skill in the art at the time of the amendment.

Id. (internal citation omitted). These underlying factual issues are examined "in the context of the invention." Id. at 1371 ("Factual issues thus exist as to whether an ordinarily skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve *in the context of the invention.*" (emphasis added)).

The Federal Circuit clarified that the relevant time for evaluating unforeseeability is when the narrowing amendment was made. Id. at 1365 n.2. The amendments at issue occurred in

1981. According to Festo's un rebutted evidence, one of ordinary skill in the art in 1981 would be a person having a degree in mechanical engineering and/or several years of experience in developing fluid driven mechanical devices. (Wolf Direct at 12; Schroeder Direct at 10.)

B. Sealing Ring

The issue on remand is the objective unforeseeability of a single two-way sealing ring. The German device employed a single sealing ring that sealed in both directions. (Tr. at 52, 111, 2/22.) Therefore, as Festo's expert conceded at trial on remand, a single sealing ring does not constitute "later-developed technology" as the Federal Circuit described it. See Festo, 344 F.3d at 1369 ("transistors in relation to vacuum tubes, or Velcro® in relation to fasteners").⁸

Moreover, the use of a single sealing ring was "known in the relevant art" at the time of the 1981 amendments. See id. The German patent constitutes relevant art for the design of sealing rings in the Festo device because the basic purpose of the sealing ring in both devices is the same. Cf. Bancorp Servs., L.L.C. v. Hartford Life Ins. Co., 359 F.3d 1367, 1375 (Fed. Cir. 2004) ("In determining the relevant art for purposes of addressing issues of patent validity, the court must look to the

⁸ "It turns out that ... large-gap rodless cylinders were available at that time, but that was old technology." (Tr. at 35 (Testimony of Dr. Wolf).)

nature of the problem confronting the inventor."); In re Clay, 966 F.2d 656, 658-59 (Fed. Cir. 1992) ("Two criteria have evolved for determining whether prior art is analogous [for purposes of determining obviousness]: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved."). Because a single sealing ring was "known in the prior art in the field of the invention, it certainly should have been foreseeable." Festo, 344 F.3d at 1369.

Festo argues that the German patent is beyond the "context of the invention" of the '125 patent, see id. at 1371, because the German device is a "large gap" device. (Tr. at 111-12.)⁹ Specifically, Festo contends that use of a single sealing ring would have been unforeseeable in a "small gap" device because a "small gap" device, unlike the German device, requires a second sealing ring to prevent torsional deforming moments caused by the

⁹ "The context of the invention is the following: [Stoll] knows he needs large coupling forces. He would like to keep this gap as small as possible. In order to have a very small gap, he has to have a very, very thin tube. It turns out that he was aware that if he had this thin tube, it would deform. He needed the sealing ring there to back up against the wiping ring on the driven member to prevent the deformation. That's the context of the invention, a very, very thin tube, because otherwise he wouldn't be doing what he's trying to do, which is to get large coupling forces." (Tr. at 112 (Testimony of Dr. Wolf).)

large magnetic coupling forces. (Id. at 112, 2/13.) Festo points out that the only other "small gap" rodless cylinder existing at the time of the amendments was shown in United States Patent No. 4,488,477 ("the '477 patent") owned by SMC, which discloses a symmetric system of rings (i.e., a sealing ring and guide ring on each end of the piston) to accomplish the wiping, guiding, and sealing functions as well as to avoid undesirable torsional deforming moments on the thin-walled tube. (Wolf Direct at 13-14.) Therefore, Festo argues, there was no teaching regarding the use of an asymmetric ring arrangement, in the context of the Festo device, available to a person of ordinary skill in the art at the time of the 1981 amendments.

The viability of this argument depends on the distinction between "large gap" and "small gap" devices. However, Festo presented no empirical evidence on remand regarding the size of the respective gaps in the Festo device or the German device, or more specifically, the thickness of the cylinders in the two devices. (Tr. at 2/22.) Although Festo contends that such evidence is irrelevant because the '125 patent teaches that the context of the invention is a gap "as small as possible,"¹⁰ objective foreseeability analysis does not hinge on the terms of

¹⁰ "Q. Do you know how thick the walls of the tubes in Festo's commercial product are? A. No, I don't, and it doesn't matter. Q. Do you know how thick the wall of the tubes in SMC's commercial products are? A. No, I don't, and it doesn't matter." (Tr. at 2/22 (Testimony of Dr. Wolf).)

the patent itself. With no empirical evidence to distinguish between a "large gap" and "small gap" device, the single sealing ring in the prior art German patent is strong evidence that use of a single sealing ring would have been foreseeable, in the context of the Festo device, to one of ordinary skill in the art at the time of the 1981 amendments.

Moreover, as Festo's experts themselves testified, the use of two sealing rings is not the only means to prevent torsional deforming moments. Torsional deforming moments could be avoided by use of a relatively thicker cylinder wall. (Id. at 39, 2/12, 2/31.) Again, Festo argues that any increase in cylinder thickness would be outside the context of the '125 patent because of the need for a cylinder "as thin as possible" to maintain strong coupling forces. However, there was no evidence at trial on remand regarding how much thicker a cylinder would have to be, relative to the Festo device cylinder, to prevent torsional deforming moments. Likewise, there was no evidence regarding the rate at which increasing the thickness of a cylinder decreases the strength of the coupling forces.¹¹ Thus, Festo has not proven that use of a wall thick enough to prevent deformation would have been outside the context of the invention at the time

¹¹ "THE COURT: Have you done experiments with how thin or thick a wall would have to be to only go with one sealing ring, whether that would affect the coupling between the magnets? THE WITNESS: Well, there are actually so many variables, you really can't do experiments." (Tr. at 40 (Testimony of Dr. Wolf).)

of amendment, and therefore, has not proven that use of a single sealing ring would have been unforeseeable in the context of the invention.

Festo has also failed to prove why a single sealing ring was unforeseeable at the time of the 1981 amendments but a viable option in the SMC device. Festo argues that developments in magnet technology enabled the use of a single sealing ring in the later-invented SMC device. Festo contends that SMC achieved strong coupling forces despite using a thicker cylinder (which did not require a second sealing ring to prevent torsional deforming moments) because stronger magnets were developed after the 1981 amendments. (See id. at 39, 2/11-12, 2/34.)

However, Festo presented no empirical evidence to support this argument. Festo presented no evidence regarding the type of magnets in the SMC device or the strength of those magnets, either independently or relative to the magnets in the Festo device. (See id. at 2/52, 2/77, 2/80, 2/88.) Festo also presented no measurements of the thickness of the SMC cylinder. (See id. at 2/22, 2/39.) Festo's only evidence regarding what changed between the 1981 amendments and the SMC device is expert assertions that the SMC cylinder is "much thicker" than the Festo cylinder and that the SMC magnets are "much stronger" than the Festo magnets. (Id. at 2/34-35.) Without testing or quantification, this testimony is insufficient to meet Festo's burden of proving the accused SMC device's single sealing ring

unforeseeable.¹² Dr. Wolf was not persuasive in his testimony that a two-way sealing ring would have rendered the Festo device a failure. (See id. at 2/31-33.) Indeed, he testified to the contrary in the 1994 trial. (See id. at 2/16 ("In fact the [Stoll] patent says that a single ring is good enough.").)

The fact that a single sealing ring may have been considered objectively inferior in a "small gap" device in 1981 is also insufficient to meet Festo's burden. See Festo, 344 F.3d at 1373. "[I]f the patentees knew of an inferior design and chose not to include it within the claims, then it cannot be said that they could not have been expected to describe that design." Id. Therefore, Festo has not met its burden of proving the use of a single sealing ring objectively unforeseeable.

C. Sleeve

Non-magnetizable aluminum alloy was known and available at the time of the amendments to the '125 patent application. See Festo, 344 F.3d at 1371 ("[I]t seems unlikely that an aluminum sleeve would have been unforeseeable, as it was made of a commonly available metal"). Significantly, Stoll's German patent device used a non-magnetizable sleeve. (Def. Ex. 7 at SA22089; Tr. at 55-58.) Thus, like a single sealing ring, a non-magnetizable sleeve does not, in itself, constitute "later-

¹² Dr. Wolf's testimony did not clarify the ambiguity: "You know, the word 'thicker' is a funny word. Thicker, we don't mean a foot." (Tr. at 2/35.)

developed technology," see Festo, 344 F.3d at 1369, and was "known in the relevant art," see id.

Festo argues that a non-magnetizable sleeve was unforeseeable because the '125 patent teaches the need to shield against magnetic leakage fields, and any shielding capability of non-magnetizable aluminum alloy was unknown in 1981.¹³ As Dr. Schroeder testified, if one wants to prevent a magnetic field from attracting a nearby metallic object, the magnetic field lines must be channeled using a magnetizable material. (See Tr. at 2/66-68.) There is no dispute that magnetizable material shields against leakage fields, that significant leakage fields could cause undesirable braking forces, and that any shielding capability of non-magnetizable aluminum alloy was unknown in the literature or to one of ordinary skill in 1981. If significant leakage fields were a concern in the context of the invention at the time of the amendments, a non-magnetizable aluminum alloy sleeve, which provided no known shielding, would not have been a foreseeable equivalent of a magnetizable sleeve.

However, Festo has not proven that significant leakage fields, and therefore shielding, were an objective concern in the context of the invention at the time of the amendments. Festo emphasizes that leakage fields were a concern to Dr. Stoll and

¹³ "The context of the invention is that you want to provide shielding to prevent the braking forces." (Tr. at 92 (Testimony of Dr. Wolf).)

that the '125 patent teaches the need for shielding. Dr. Schroeder testified, "The small gap device, you want to concentrate the magnetic field lines in the gap to give you strong coupling forces, but the behavior of magnetic field lines is such that you cannot avoid leakage fields." (Id. at 2/114). However, Festo presented no empirical evidence as to the strength of leakage fields in the Festo device. Festo never measured the leakage fields for a Festo rodless cylinder without the sleeve. (Id. at 2/130.) Moreover, Dr. Schroeder testified that the Festo device is designed to minimize leakage fields. (Id. at 2/102-03, 2/110, 2/113.) If there had been significant leakage fields, according to Festo's expert, Festo would have had to redesign the whole device. (Id. at 2/111.)

Significantly, there was evidence that Stoll knew that the Festo device did not "need a magnetizable sleeve because [the] leakage field is very small." (Id. at 84; see id. at 82-83, 2/115.) Moreover, the '125 patent describes the shielding benefit of a magnetizable sleeve as beneficial but not necessary to the operation of the device. It states that "[i]f" a magnetizable sleeve is used, then "magnetic leakage fields in the vicinity of the driven assembly can be kept to a minimum." '125 patent, col. 2, ll. 23-27. The terms of the patent itself therefore suggest that a non-magnetizable sleeve was foreseeable because the magnetic fields are already minimized by the design of the device.

Festo is left with the argument that a non-magnetizable sleeve would have been unforeseeable at the time of the 1981 amendments because one of ordinary skill in the art would have provided shielding, and therefore a magnetizable sleeve, as a matter of course. However, as SMC points out, Festo not only submitted its original claim in the United States (and claims in seven foreign countries) that encompassed the non-magnetizable sleeve, but also advocated that the magnetizable limitation was an "unintentional limitation[] added incorrectly by an attorney." (Def. Ex. 8 at SA22506.) The evidence that the Festo device, even without a magnetizable sleeve, was designed to minimize leakage fields indicates that use of a non-magnetizable sleeve was foreseeable. The evidence suggests that a person of ordinary skill in the art, at most, would have considered a device with a non-magnetizable sleeve inferior. However, as with the single sealing ring, inferiority does not equate with unforeseeability. Cf. Festo, 344 F.3d at 1372 (Festo's "inferior" argument "suggests that Stoll could have described an aluminum sleeve but chose not to do so because that 'inferior' element was not a part of his invention.").

D. Conclusion

This case has had as many twists and turns and ups and downs as the Thunder Mountain amusement park ride it facilitated. Both sides, unfortunately, had to bear extensive litigation costs as the ground rules changed. Nonetheless, the (hopefully) final

question before this Court is quite narrow.

Because both the single sealing ring and non-magnetizable sleeve were foreseeable to a person of ordinary skill in the art at the time of the 1981 amendments, Festo is unable to rebut the presumption of surrender of those two elements. See Festo, 344 F.3d at 1374. Therefore, "prosecution history estoppel bars Festo from relying on the doctrine of equivalents" for its claim that the SMC device infringes the '125 patent. Id. Because the jury at the first trial in this case found that the SMC device infringed the '125 patent based on the doctrine of equivalents, id. at 1364, that finding is vacated.

V. ORDER

The Court orders entry of judgment for defendant SMC on plaintiff's claim of infringement of United States Patent No. 4,354,125.

S/PATTI B. SARIS

United States District Judge